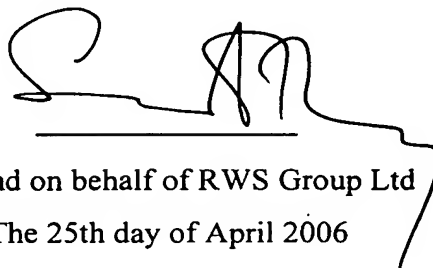


UNITED STATES PATENT AND TRADEMARK OFFICE

I, Susan ANTHONY BA, ACIS,

Director of RWS Group Ltd, of Europa House, Marsham Way, Gerrards Cross, Buckinghamshire, England declare;

1. That I am a citizen of the United Kingdom of Great Britain and Northern Ireland.
2. That the translator responsible for the attached translation is well acquainted with the German and English languages.
3. That the attached is, to the best of RWS Group Ltd knowledge and belief, a true translation into the English language of the specification in German filed with the application for a patent in the U.S.A. on
under the number
4. That I believe that all statements made herein of my own knowledge are true and that all statements made on information and belief are true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the patent application in the United States of America or any patent issuing thereon.



For and on behalf of RWS Group Ltd
The 25th day of April 2006

Connecting device for furniture panels

The invention relates to a connecting device for furniture panels according to the preamble to claim 1.

5

Prior art

In furniture, in particular in tables, the requirement to be able to connect corresponding panels in a variable manner is frequently expressed. This is particularly important, above all, in respect of conference tables. In conjunction with this, it is often necessary to have a rather larger conference table available depending on the number of participants. Table systems are already in use, which are assembled from a plurality of individual tables and/or connecting panels, attachment panels, etc.

For the purpose of connecting the individual table panels together, connectors are commercially available, for example, which are connected together on the one hand with the help of tools such as screwdrivers, etc., and/or with the help of a third component part such as screws or star grips. A disadvantage associated with this, however, is partly the requirement for a tool, which must accordingly be kept ready to hand. The screws or star grips can be mislaid in the course of time, on the other hand, so that the connection of the table panels is no longer feasible in this case.

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In addition, tool-free connectors are already commonly in use for table panels. These suffer from the disadvantage, however, that they are intended for specific table programs, which significantly reduces their usefulness.

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Object and advantages of the invention

The object of the invention, on the other hand, is to

propose a connecting device or a connector for furniture panels, comprising a first guiding element which is used to guide a locking element and which is arranged on a first furniture panel, by means of which
5 furniture panels are capable of being connected together without tools and independently of specific table programs.

This object is achieved by the characterizing features
10 of claim 1, taking as the starting point a connecting device or a connector of the kind referred to by way of introduction.

Advantageous embodiments and further developments of
15 the invention are possible by the means referred to in the dependent claims.

Accordingly, a connecting device or connector in accordance with the invention is characterized in that
20 the locking element is embodied as a curved locking element, the first guiding element exhibiting at least one curved, first guiding area for guiding the locking element and, arranged on a second furniture panel, a second guiding element with a curved, second guiding
25 area being provided for guiding the locking element.

Engagement behind the guiding elements can be achieved with the help of the curved locking element, so that the need for catching, trapping or tensioning by means
30 of an additional arrangement is capable of being dispensed with. A particularly simple realization of a tool-free connection of furniture or table panels can be implemented in this way.

35 The guiding elements and/or the furniture panel in each case advantageously exhibit at least one contact surface arranged transversely to the direction of movement of the locking element to enable contact to be made by the locking element. A mechanical, non-positive

connection of the two guiding elements and table panels is implemented by this means. The contact surface can absorb transversely oriented compression forces and, where appropriate, frictional forces running parallel to the surface, which permits a particularly stable, strong connection and linking of the furniture and table panels.

In one particular further development of the invention, each of the guiding elements exhibits at least two contact surfaces arranged in an essentially orthogonal relationship with one another. For example, the guiding elements and/or the locking element in each case comprise at least one groove and/or one tongue with the one or more contact surfaces.

The engagement by the locking element behind the guiding elements advantageously produces a mechanically strong linking of the furniture panels, so that the panels are securely attached to one another in a first spatial direction. The contact surface or the contact surfaces is/are preferably so arranged that it/they also connect the two furniture panels together in the second and/or third spatial direction. In this way, for example, the furniture panels are drawn to a common level by the connector in accordance with the invention. This means that the panels are linked together advantageously without any vertical projection or mismatch.

In an advantageous embodiment of the invention, the locking element is arranged at least partially between the furniture panel and the guiding element. A particularly stable fixing can be achieved in this way, and a guiding element of particularly simple execution or form can be produced and/or mounted on the furniture panel. In this embodiment of the invention, one area in particular of the underside of the furniture panel is embodied as a contact surface for the locking element.

In one particular variant of the invention, the locking element is executed in a pivoting fashion. The locking element can possibly pivot about a virtual or a real
5 pivoting axis. This means that, for example, a hinge, a pivoting mechanism with a pivoting axis or pivoting shaft, etc., is capable of being generated as a real pivoting axis, or that a virtual pivoting axis is capable of being generated, in such a way that, on the
10 basis of an advantageous guide path, a non-material, geometrical pivoting axis is produced, about which the locking element pivots.

The locking element is advantageously embodied in a
15 pivotal manner essentially parallel or on a parallel plane with the furniture panel. An advantageous orientation of the pivoting movement is achieved by this means. In addition, the connection of the furniture panels at a single level is facilitated in
20 this way, since the guiding elements are capable advantageously of being arranged accordingly in parallel with the panels.

At least one area of the cross section of the guiding
25 element preferably forms a segment of a circle, an annular or circular segment or the like. A particularly simple guide along a curved path is capable of being embodied by this means, it being possible for the guiding path to be embodied as a circle or part of a
30 circle. Corresponding elements can be manufactured particularly easily. These elements are possibly manufactured with the aid of turning machining processes or the like. In addition, corresponding elements can be manufactured by casting processes, in
35 conjunction with which turning machining processes are capable of being used, if necessary, in conjunction with the manufacture of the female moulds.

Plastics, metals such as aluminum, steel, brass, etc.,

wood and/or the like can be specified as a general rule as materials for the connector or individual parts of the connector. Corresponding elements made of plastic and/or metal are preferably manufactured by the casting process.

A gap or distance is advantageously embodied between the two guiding elements in the connected state of the furniture panels. This gap has the effect of ensuring, in particular, that an individual furniture panel that is not connected to another furniture panel exhibits a guiding element that is offset in relation to the connecting edge, so that the guiding element at least partially disappears from the visual field. Furthermore, the accuracy of the assembly position of the guiding elements and the exactly flush orientation of the longitudinal edge of the guiding element in relation to the edge of the furniture panel are reduced by this means, and the assembly is thereby simplified.

At least two locking elements are provided in one particular variant of the invention. The possibility is made available by this means, for example, for one locking element to be assigned to each guiding element in each case.

Advantageously, the two locking elements essentially form a circle or a semi-circle in the connected state of the furniture panels, in conjunction with which at least one, and preferably two locking elements are oriented transversely to the connecting edge of the furniture panel. A particularly stable and load-resistant connection of the two furniture panels is achieved through the two locking elements, which are oriented as a general rule transversely to the connecting edge of the furniture panels.

The connector in accordance with the invention can basically be arranged along one side and/or in the

corner area of a furniture panel. If the connector is arranged at a corner, the corresponding guiding element will preferably travel over an angular range of about 90° or a quarter of a circle. In the case of the lateral arrangement of the connector, the guiding element will preferably travel over an angular range of about 180° or half a circle.

Preferably at least one catch unit for the engagement of the locking element with the guiding element is provided. With the help of a catch unit in accordance with the invention, one or a plurality of defined, preset catch positions can be provided for the locking element. These catch positions can be used for advantageous functions or opportunities for the operation or use of the connector in accordance with the invention. For example, a defined, closed and/or open position can be determined by means of the catch arrangement. The catch engagement of the locking element generally prevents its unintentional displacement, so that both an undesired projection and also an unintentional entry of the locking element into the guiding element are effectively prevented. For example, the catch unit comprises a spring/damping element, for example a spiral, leaf and/or plastic or metal spring, and engagement is achieved with the help of this and an advantageous recess.

In one particular further development of the invention, the catch unit comprises at least one catch position, in which the locking element exhibits a projection extending beyond the furniture panel. The projection by the connector beyond the edge of the furniture panel is preferably smaller than the distance from the opposing guiding element of the other connector to the edge of its furniture panel. This means in particular that the projection is smaller than half the gap between the two interacting connectors. As a result of this, although the locking element projects beyond the corresponding

furniture panel, it is not capable of being connected to the other or second connector.

5 For example, a furniture panel with a second connector can be laid or set down on the projection of the correspondingly positioned locking element of the first connector in a first operating stage. In a following, second operating stage, the locking element of the first connector can be connected to the second
10 connector in an advantageous manner. The possibility is afforded in this way for a single person to insert or assemble a furniture panel exhibiting a connector in accordance with the invention without a table base, for example between each of two tables. This means that so-called one-man operation is possible, among other
15 things for an extensive or variable conference table system or the like. This plays a critical part in facilitating the building or the assembly/dismantling of a table system, for example in the case of
20 conference table systems, etc.

At least one blocking unit is advantageously provided for blocking the displacement of the locking element in relation to the guiding element. Displacement of the
25 locking element can be completely eliminated with the help of this blocking unit. For example, an unintentional and/or a displacement beyond a given point can be effectively prevented. The blocking unit preferably includes an end stop for determining an end
30 position of the locking element, for example a completely open and/or closed position. The blocking unit may possibly comprise a toothed arrangement, etc., for blocking the locking element in a number of positions. In particular an unintentional loss or
35 loosening of the locking element is effectively prevented in an advantageous manner with these variants of the invention. Spontaneous dismantling of the connector in accordance with the invention is prevented in this way.

In an advantageous embodiment of the invention, the blocking unit exhibits a blocking groove and a formed contact area or a contact pin or the like, one part of the blocking unit being arranged on the locking element, and the other part being arranged on the guiding element. The contact pin in this case is preferably adjustable along the blocking groove and makes contact with at least one corresponding blocking stop, preferably at the two ends of the blocking groove. Blocking of the connector in accordance with the invention is implemented particularly simply in this way.

At least one retaining unit for holding the locking element together with the guiding element is provided advantageously. The blocking unit can include the retaining unit. On the other hand, a separate retaining unit can be provided. For example, the blocking unit prevents the displacement or the loosening of the locking element from the guiding element in one spatial direction, preferably in the direction of the displacement path, and the retaining unit prevents the displacement or loosening of the locking element from the guiding element in one or two other spatial directions, in particular having an orthogonal orientation to the aforementioned spatial directions. Loosening of the locking element from the guiding element, from the furniture panel or from furniture during its operation or use is completely prevented in this way.

The catch unit is preferably embodied as the retaining unit. The number of component parts used is reduced through this multifunctional embodiment of the unit, so that a favorable implementation of the invention in terms of its design and economy is achieved. For example, the catch unit comprises a plastic leaf spring, which is embodied in such a way that it also

retains the locking element in the directions that are oriented transversely to the direction of displacement at the same time.

5 In one particular further development of the invention, the two guiding elements and/or the two locking elements are of essentially identical embodiment. It is possible by this means to realize a connector for furniture panels essentially comprising two structural
10 units, the two structural units being identical as a general rule. As a result of this, the furniture panels are capable of being connected or attached to one another at will, without the need to take note of which structural unit exhibits an insert, and which
15 structural unit exhibits a receiver for the insert. The latter is frequently necessary with connectors for furniture panels in accordance with the prior art. This then leads to the situation in which one structural unit is executed as a so-called father, and one
20 structural unit is executed as a so-called mother, which must fit into one another. On the other hand, no corresponding "father-mother problem" can arise in accordance with the invention, which greatly facilitates the connection of furniture panels with the
25 help of the connector in accordance with the invention, or makes it a more flexible operation.

The locking element advantageously exhibits at least one formed area or nose and/or a recess or a depression
30 for the displacement of the locking element. A comparatively easy displacement of the locking element is permitted by the improved operation that is achieved by this means.

35 It is generally possible in accordance with the invention for the connector for furniture panels to be applied and/or retrofitted to any desired furniture panels or furniture systems.

The connecting device in accordance with the invention is preferably embodied as a fitting for furniture or furniture panels. In this way, any desired furniture or furniture panels, in particular table panels or the like, can be equipped and/or retrofitted with correspondingly advantageous fittings. A significant modification to the furniture panels is thus not required. For example, the connection devices are fixed to furniture panels with the help of fixing elements, for example screws, rivets, pins, nails or the like, and/or by means of an adhesive. This means that separate structural units or connecting devices in accordance with the invention are applied or attached to furniture panels in particular with at least one guiding element and one locking element.

Only advantageous drilled holes, for example, must be provided on the furniture panels, where appropriate, in order to improve the fixing by means of screws. There is no need to provide costly recesses in the furniture panels, such as grooves, milled slots or the like. The implementation of the invention is simplified in this way, and the stability of the linking is increased at the same time. Corresponding furniture panels are frequently manufactured from particleboards or the like, which can be damaged or can become worn comparatively easily in conjunction with guiding of the locking element and when under load.

The stability and the wear are basically significantly improved, and the service life is thus crucially extended, with guiding and/or locking elements, for example made of metal and/or plastic, that are capable of being attached separately to the furniture panel.

35

Illustrative embodiment

An illustrative embodiment of the invention is presented in the drawing and is explained below in

greater detail with reference to the figures.

The individual figures show the following:

- 5 Figure 1 is a schematic view of two table panels
 connected together with a connector in
 accordance with the invention,
- 10 Figure 2 is a schematic section through the
 arrangement in accordance with Figure 1,
- 15 Figure 3 is a further, schematic section through
 the arrangement in accordance with
 Figure 1,
- 20 Figure 4 is a schematic view with sectioned
 representations of a guiding element of
 a second connector in accordance with
 the invention,
- 25 Figure 5 is a schematic view with sectioned
 representations of a locking element of
 the second connector in accordance with
 the invention,
- 30 Figure 6 is schematic views of a third connector
 in accordance with the invention,
- Figure 7 is schematic views of a guiding element
 of the third connector in accordance
 with the invention,
- 35 Figure 8 is schematic views of a locking element
 of the third connector in accordance
 with the invention,
- Figure 9 is a schematic, perspective view of a
 security catch of the third connector in
 accordance with the invention.

Represented in Figure 1 is a detail of two furniture panels with a connector in accordance with the invention. The connector is fixed to a furniture panel 1 and a furniture panel 2. For the purposes of fixing, the connector in accordance with this variant embodiment exhibits recesses 3, into which a screw or the like is capable of being placed or countersunk, for example, in each case. In the interests of greater clarity, it has been decided to dispense with the representation of the corresponding screws, etc.

The connector comprises in particular two guiding elements 4 and 5, which in each case exhibit two recesses 3 for fixing to the corresponding panel 1 and 2. The two guiding elements 4, 5 are situated at a certain distance from one another by a gap 6 in the locked condition in accordance with Figure 1. In this case, every guiding element 4 or 5 is separated from a guiding edge 7 by almost the same distance. The use of a gauge is conceivable for the assembly of the guiding elements 4, 5 to the panel 1, 2, which gauge is applied to the edge of the table and exhibits a step, to which the guiding element 4, 5 is applied in turn. The distance to the edge and half of the width of the gap are thus determined by the step in the gauge.

The guiding elements 4 and 5 are embodied in each case as the segment of a circle, in conjunction with which the two guiding elements 4 and 5 generate an essentially circular arrangement together with the gap 6. This means that these 4, 5 each travel over an angular range of about 180°. In the case of a corner connector, on the other hand, that is not illustrated in greater detail here, the angular range would be about 90°.

For the connection between the two guiding elements 4, 5, two bolts 8 and 9 are provided which are arranged

essentially transversely to the edges 7 of the table in the locked position. By this means, the two bolts 8 and 9 engage behind the two guiding elements 4 and 5, in such a way that the two table panels 1 and 2 are linked securely with one another transversely to the edges 7 of the table.

Figure 2 represents a section through the device in accordance with Figure 1, in conjunction with which the arrangement is sectioned along the line A-A. In the interests of greater clarity, it has been decided to dispense with the representation of the bolts 8 and 9 in Figure 2. It is clear from Figure 2 that the guiding elements 4 and 5 in each case exhibit at least one groove 10 and tongue 11, into which the bolts 8 and 9 are introduced.

At the same time, it is clear that the bolts 8 and 9 must be arranged between the guiding elements 4 and 5 and the corresponding table panel 1 and 2. By these means both the table panels 1, 2 and the guiding elements 4, 5 constitute contact surfaces 12, along which the bolts 8 and 9 are guided and are fixed transversely thereto. A mechanically stable linking of the table panels 1 and 2 in all three spatial directions is implemented by these contact surfaces 12 that are arranged partially in an orthogonal relationship to one another, and also by the engagement of the bolts 8 and 9 behind the guiding elements 4 and 5.

A section along the line B-B in accordance with Figure 1 is illustrated in Figure 3, in conjunction with which the representation of the guiding elements 4 and 5 is dispensed with in the interest of greater clarity. The bolts 8 and 9 in each case exhibit a groove 13 and a tongue 14, which fit in the grooves 10 and tongues 11 of the guiding elements 4 and 5, so that an advantageous guide along the guiding directions 15 and

16 is achieved.

Furthermore, the representation in accordance with Figure 1 illustrates clearly that the bolts 8 and 9 extend over an angular segment, which corresponds to the angular segment of the guiding elements 4 and 5. What is achieved in this way is that, in the event of the displacement of the bolts 8 and 9 along the directions of guiding 15, 16 into an unlocked position, end faces 17 and 18 of the bolts 8, 9 can line themselves up essentially in alignment and flush with the edges 19 and 20 of the guiding elements 4, 5. Complete disconnection and unlocking of the two furniture panels 1 and 2 are thereby achieved.

It is conceivable that the bolts 8, 9 have noses and formed areas, which are not represented in greater detail in Figures 1 to 3 and projecting in a radial direction, with the help of which a displacement along the direction of guiding 15 and 16 is achieved.

The connector presented in the embodiment in each case exhibits two essentially identical guiding elements 4, 5 and bolts 8, 9, so that two units of identical construction are produced in the released position. In this way, unlike the prior art, no so-called "father-mother problem" can arise. This means that, in conjunction with the linking of two table panels, it is not necessary to take note of which part of the connector is present in which table panel.

Second embodiments of guiding elements 4, 5 and locking elements 8, 9 in accordance with the invention are illustrated in Figures 4 and 5. Identical reference designations are used here to identify similar parts represented in Figures 1 to 3. The furniture panels 1, 2 are not illustrated in Figures 4 and 5 in the interest of greater clarity.

Unlike the variants in accordance with Figures 1 to 3, the variants in Figures 4 and 5 in particular exhibit a catch 21, into which a catch nose, not illustrated in more detail here, engages. The catch nose is pressed
5 into the catch by means of a leaf spring. The entire unit comprising the catch nose and the leaf spring is made of plastic, for example. At the same time, the entire unit can be embodied in such a way that it holds together the bolt 8, 9 and the guiding element 4, 5
10 transversely to the direction of displacement 15, 16, among other things by means of fixings 22 and with a projection that is not illustrated here.

An intermediate position of the bolt 4, 5 is achieved
15 with the catches 21a, this projecting slightly beyond the panel 1, 2 in a manner that is not illustrated in more detail here, so that an individual plate 1, 2 can be placed on the projection.

A nose 23 and depressions 24 in the bolts 8, 9
20 facilitate the displacement and engagement and/or release of the locking. In the illustrated variant, the nose 23 exhibits an optional recess 25 that may be provided.

For the purpose of blocking the bolts 8, 9 with the
25 guiding element in each case, these exhibit a hollow groove 27 of the tongue 14 and a contact pin 26. The contact pin 26 is embodied in this variant as a formed
30 area of the guiding element 4, 5 in the base of the groove 10. The contact pin 26 makes contact in the end position at the end 28 of the hollow groove 27, so that reliable determination of the end position is assured and unintentional loss of the bolt 4, 5 is effectively
35 prevented in this way.

Third embodiments of guiding elements 4, 5 and locking elements 8, 9 in accordance with the invention are illustrated in Figures 6 to 9. Identical reference

designations are used here to identify similar parts represented in Figures 1 to 5. The furniture panels 1, 2 are not illustrated in Figures 4 and 5 in the interest of greater clarity.

5

Unlike the variants in accordance with Figures 1 to 5, the variants in Figures 6 to 9 exhibit recesses 3 and drilled holes 3 lying in particular in the outer area of the guiding elements 4, 5, by means of which the connector and fittings can be attached to a planar furniture panel. For example, a screw or the like can be provided for the purpose of attaching the connector to the furniture panel by means of the drilled holes. The comparatively large distance between the recesses 3 improves the fixing of the connector to the furniture panel.

In addition, in this variant of the invention, the guiding element 4, 5 is arranged on the periphery, and the locking element 8, 9 is arranged on the inside and centrally. Figure 6 shows the installed connector and fitting as a perspective view as well as a view from above. In the view from above in accordance with Figure 6b, a securing means 29 is also shown. This is illustrated in perspective in Figure 9, in conjunction with which in particular a catch nose 30 is represented for engagement with the catch 21 of the guiding element 4, 5 and corresponding recesses.

The catch nose 30 of the securing means 29 is pressed against the catch 21 of the guiding element 4, 5 by means of a leaf spring 31. The securing means is preferably made of plastic and/or a resilient metal. In addition, the securing means 29 includes a retaining nose 32 for holding together the bolt 8, 9 and the guiding element 4, 5 in each case in the state in which they are not attached to the furniture panel 1, 2. In the state in which it is attached to the furniture panel 1, 2, the retaining nose 32 is essentially

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without function. The retaining nose 32 thereby facilitates the storage, the transport and the assembly of the connector and the fittings.

List of reference designations

	1	Panel
	2	Panel
5	3	Recess
	4	Guiding element
	5	Guiding element
	6	Gap
	7	Edge
10	8	Bolt
	9	Bolt
	10	Groove
	11	Tongue
	12	Contact surface
15	13	Groove
	14	Tongue
	15	Direction of guiding
	16	Direction of guiding
	17	End surface
20	18	End surface
	19	Edge
	20	Edge
	21	Catch
	22	Fixing
25	23	Nose
	24	Depression
	25	Recess
	26	Contact pin
	27	Hollow groove
30	28	End
	29	Securing means
	30	Catch nose
	31	Leaf spring
	32	Retaining nose